

A REDESCRIPTION OF THE LARVA OF
MORION CORDATUS CHAUDOIR (COLEOPTERA:
CARABIDAE, MORIONINI)

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ABSTRACT

All three larval instars of *Morion cordatus* Chaudoir, the only species for which the larval form is known for the tribe Morionini, are described. Dorsal and ventral aspects of the third instar larvae and dorsal aspects of the head and terminal abdominal segments of the first instar larvae are illustrated.

INTRODUCTION

As result of a taxonomic synopsis of the tribe Morionini of the Western Hemisphere by Allen (1968), adults are relatively well known. However, larval stages of the tribe are poorly known.

Larval specimens of only one species from the Western Hemisphere (Costa Rica: Reventazon Riv., Hamburg Farm) have been described. These specimens were coassociated, under bark, with adults identified as *Morion georgiae* Palisot (Van Emden 1942, 1953), but *M. georgiae* is a synonym of *M. monilicornis* Latreille which is restricted to the United States and possibly Cuba (Allen 1968). Allen (1968) identified adults from this same locality (probably the same specimens) as *M. cordatus* Chaudoir. Therefore, the larval specimens should also be *M. cordatus*.

No keys are available for identification of the larvae of any genera of this small tribe of worldwide distribution. In fact, larval characters for the tribe were unknown until Van Emden (1953) realized he had incorrectly identified the *Morion* larvae from Costa Rica as *Scarites* "subg. *Distichus*?", included with the tribe Scaritini in his key to the genera of larval Carabidae (Van Emden 1942). The characters enumerated by Van Emden (1942, 1953) are sufficient to characterize the larvae of the tribe and probably of the genus *Morion* but probably not of the species *M. cordatus*.

After an extensive literature search only one illustration of a *Morion* larva has been found. Gressitt (1953) included a figure of *Morion ?orientalis* Dejean and a brief statement of its food intake while held in the laboratory. The figure was a lateral view and very little could be ascertained from it. No taxonomic description was included. Van Emden (1953), however, made a short character comparison of Gressitt's *Morion* larva with the *Morion* larva from Costa Rica and commented on the differences.

Due to the lack of illustrations and incompleteness of descriptions, I felt the larvae of *M. cordatus* should be described in more detail and illustrated. In preparation for this redescription, larval material from Panama, Mexico, and Brazil was examined. Except for the Brazilian specimen, each of the larval collections had coassociated adult *M. cordatus* collected in

the same habitats or in the immediate vicinity, or *M. cordatus* was the only species of *Morion* encountered in the area (pers. comm. with collectors: R. T. Allen, T. L. Erwin, and G. E. Ball).

Numerous attempts to locate the larva described by Van Emden (1942, 1953) have been unsuccessful. It is my understanding from personal communications with Dr. H. F. Van Emden (son of the late Dr. F. I. Van Emden) that much of his father's larval carabid collection was on loan at the time of his death and that with no written records he was unable to trace it.

LARVAL STAGES OF *Morion cordatus* CHAUDOIR

Forty larval specimens were examined: 5 first instars, 12 second instars, and 23 third instars. Head capsule length measurements were made from anterior edge of mid nasale to posterior junction of ecdysial cleavage line; widths were measured across the widest areas of the head (slightly anterior to cervical grooves). Total length measurements were made on each larva when possible, from mandible tips to apices of urogomphi. Length measurements were not taken of specimens with broken urogomphi or of curled specimens hardened in that position by the preservative.

Measurements and illustrations were made with the aid of a Wild Heerbrugg, M-5 stereomicroscope, an ocular micrometer, and a V-1.25X camera lucida attachment.

Larval descriptions have traditionally been made from later instar specimens because minute characters are easier to observe and setal patterns are more stable. Also, later instar specimens are generally the larvae which are most often encountered in the field, and they usually comprise the bulk of collections. For these reasons it seemed logical to place most emphasis on the third instar larva and develop the most detailed descriptive account from this stadium. Therefore, I give the third instar larval description first.

Third instar larva, Figs. 1-12

Total length: 19 larvae; 20.91 mm (14.0 mm-25.0 mm). Head capsule: 22 specimens; length, 1.99 mm (1.66 mm-2.28 mm); width, 2.52 mm (2.25 mm-2.84).

Head capsule, mandibles, and antennae reddish-brown to piceous; prothorax and legs brownish-yellow; mesothorax, metathorax, urogomphi, and pygopod ochraceous; sternites and tergites usually ochroleucus, sometimes brownish-yellow; abdominal cuticle creamy white.

Head: Large, rectangular, depressed, prognathus. Nasale concave, smooth, slightly produced laterally; adnasale slightly produced, projecting beyond nasale (Fig. 1). Fronto-clypeal plate gently sloping from anterior end of ecdysial cleavage line to nasale; shape and setation as in Fig. 1. Mandibles narrow, subcylindrical; retinaculum in basal half reduced, blunt; penicillus absent; lateral margin with seta opposite retinaculum and 2-3 micro-setae at lateral base (Figs. 1-4). Antennae 4-segmented with 3rd and 4th articles bearing setae; node of 3rd article absent (Fig. 4). Maxillae well developed; cardo with seta; stipes cylindrical, long, divided above basal half, with 4-segmented palpus, 2-segmented outer lobe, and small inner node (Figs. 1, 2, 5). Labium with 2-segmented palpus; ligula absent (Figs. 1, 2, 5). Eyes, 2 stemmata each (Fig. 3).

Thorax: Prothorax slightly wider and slightly shorter than head capsule; mesothorax narrower and shorter than prothorax, metathorax narrower and shorter than mesothorax.

Legs: Short, robust, each with 2 claws of unequal length, the anterior slightly longer, thicker at base (Figs. 6, 7). Thoracic spiracle large, ovoid, twice size of spiracle on first abdominal segment.

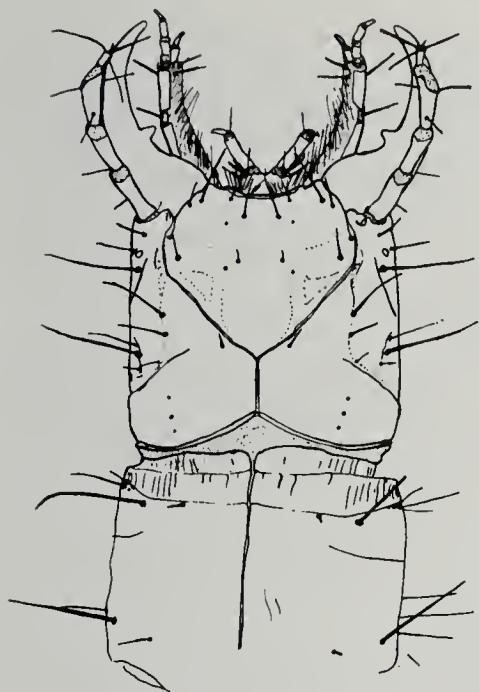


Fig. 1.

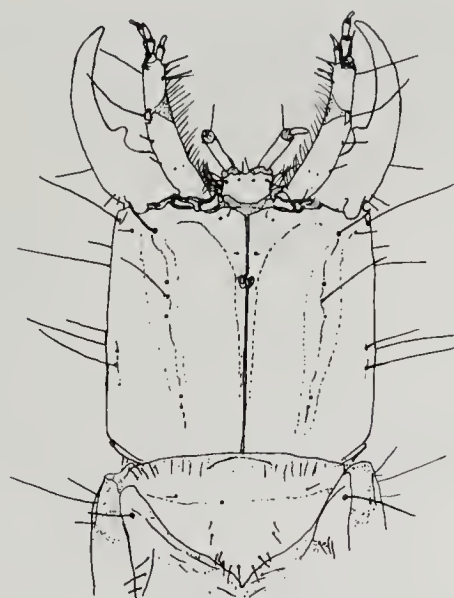


Fig. 2.

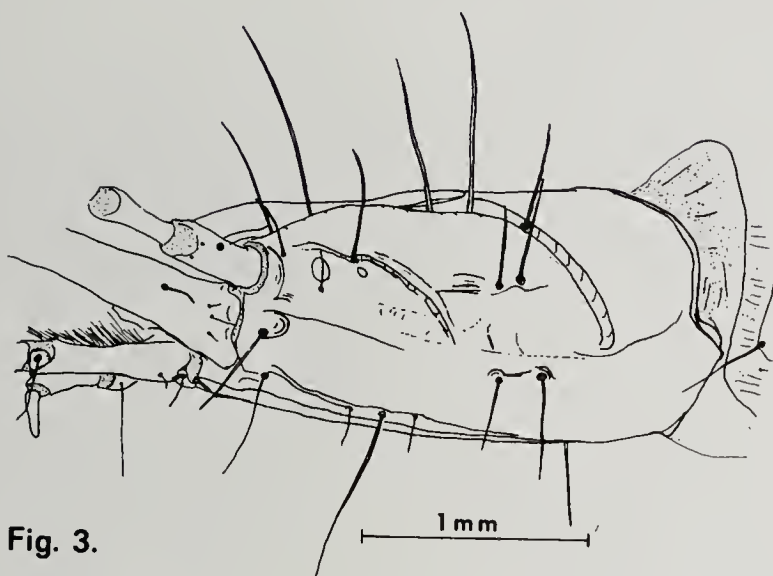


Fig. 3.

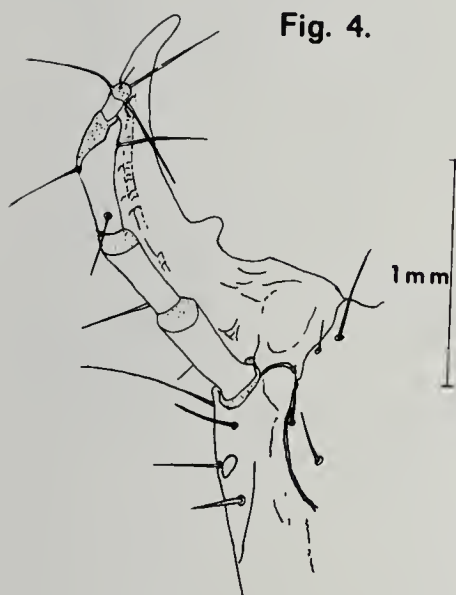


Fig. 4.

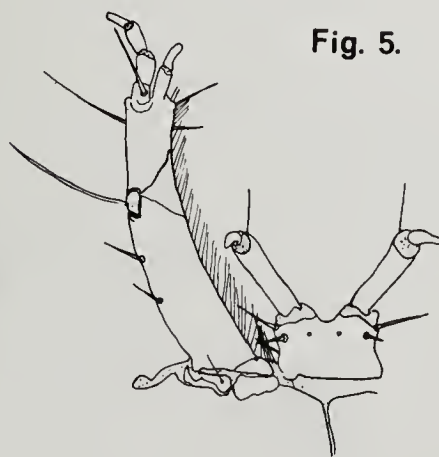
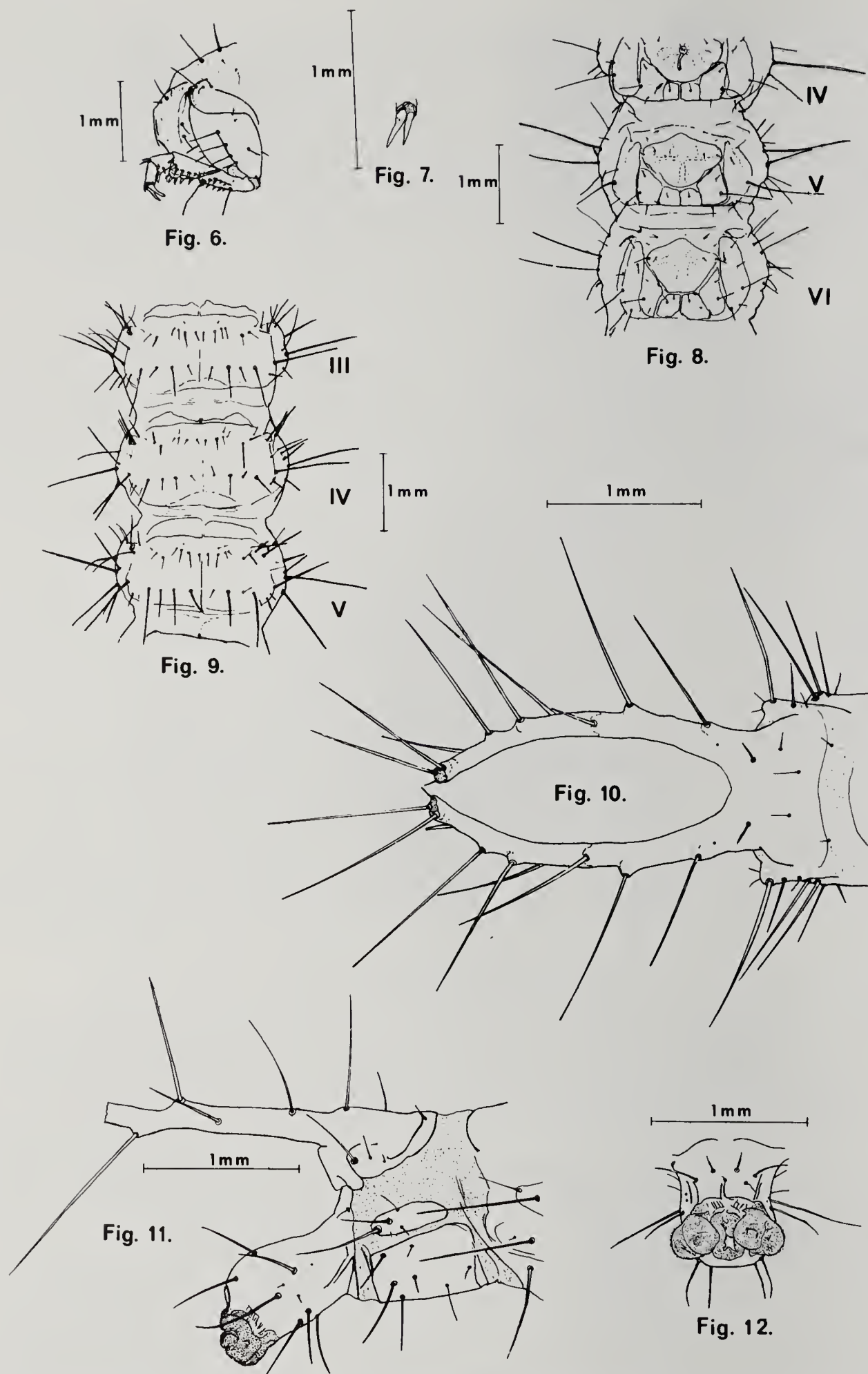


Fig. 5.

Figs. 1-5, *Morion cordatus* Chaudoir, Madden Forest, Panama, Canal Zone, third larval instar: 1) head capsule, dorsal aspect (light stippling indicates membranous area); 2) head capsule, ventral aspect; 3) head capsule, lateral aspect; 4) antenna and mandible; 5) maxilla and labium, ventral aspect.



Figs. 6-12, *Morion cordatus* Chaudoir, Madden Forest, Panama, Canal zone, third larval instar: 6) metathoracic leg; 7) tarsal claws of metathoracic leg; 8) sternites, definition unclear due to reduced pigmentation; 9) tergites, definition unclear due to reduced pigmentation; 10) urogomphi, dorsal aspect; 11) segments IX and X; 12) bifid anal lobes, extended.

Abdomen: 10-segmented, sternites and tergites generally incompletely sclerotized (Figs. 8, 9). Urogomphi fused to segment IX, unjointed, nodose, each node unisetose, apex with 2 setae and a micro seta; 9 prominent setae on each urogomphus (Fig. 10). Pygopod well developed, with 2 bifid anal lobes apically, each completely covered with microcrochets (Figs. 11, 12).

Second instar larva

Total length: 10 larvae; 13.1 mm (11.0 mm-17.0 mm). Head capsule: 11 larvae; length, 1.33 mm (1.19 mm-1.44 mm); width, 1.69 mm (1.56 mm-1.84 mm).

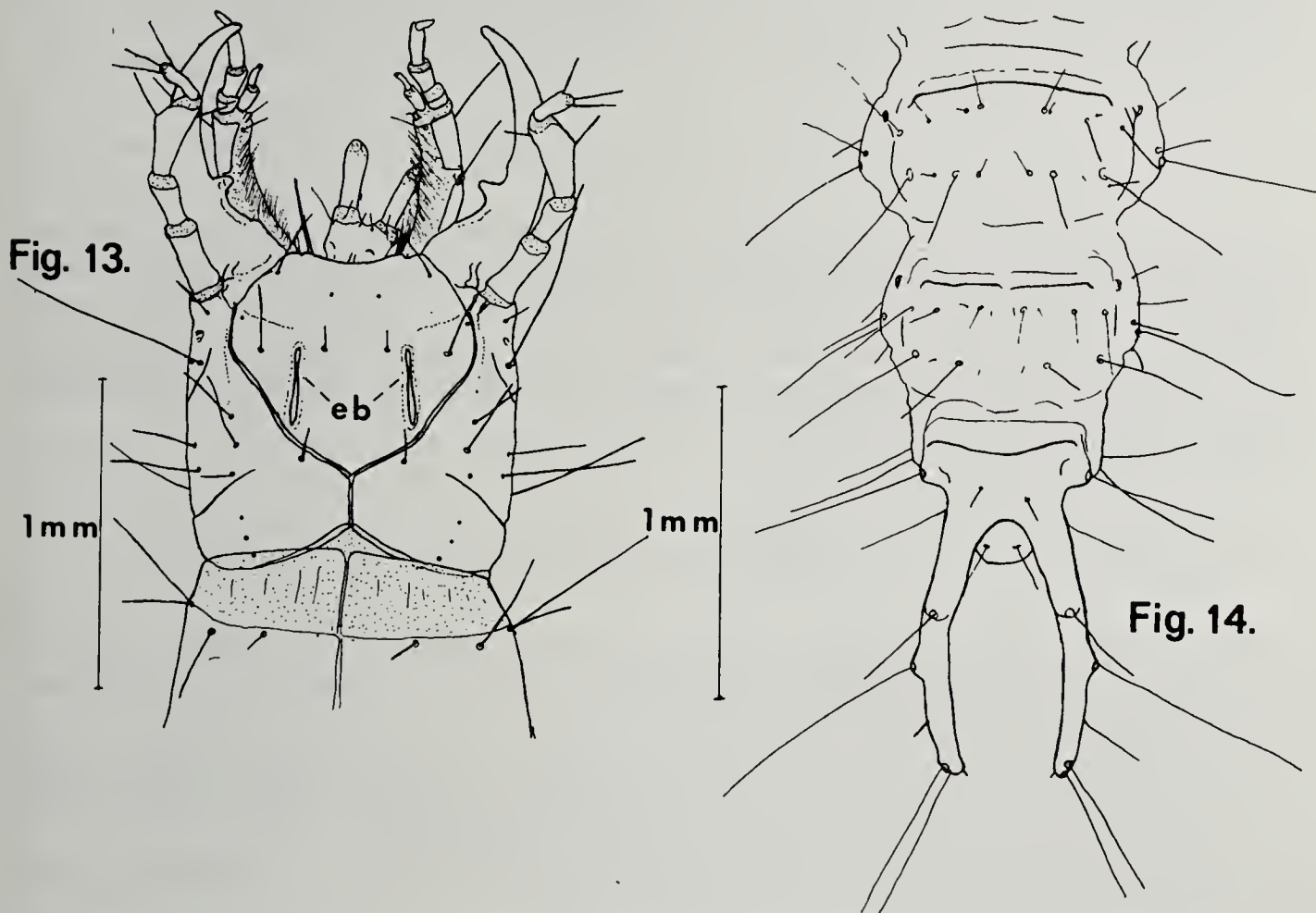
There is a noticeable overlap of total lengths between second and third instar larvae, but lengths are highly variable and depend on age from last molt and food consumed. Therefore, total length is not a reliable criterion for determination of the various instars but is reported here as a matter of reference.

The second instars are similar to the third in pigmentation and general anatomical features with exception of head capsule dimensions. The average head width of the second instars was 1.6 greater than the average head width of the first instars and the average head width of the third instars was 1.5 greater than the second instars.

First instar larva, Figs. 13-14

Total length: 5 larvae, 8.1 mm (7.0 mm-9.0 mm). Head capsule: 5 larvae; length, 0.85 mm (0.81 mm-0.88 mm); width, 1.07 mm (1.03 mm-1.16 mm).

First stadium larvae are easily distinguished from second and third stadia larvae by the reduced pigmentation, presence of egg-bursters on the fronto-clypeal plate (Fig. 13), and presence on each urogomphus of only 5 prominent setae (Fig. 14).



Figs. 13-14, *Morion cordatus* Chaudoir, Veracruz, Mexico, first larval instar: 13) head capsule, dorsal aspect (eb, egg bursters); 14) urogomphi.

DISCUSSION

Van Emden (1942) stated that the growth factor for larvae is practically equal from the first instar to the second and from the second to the third. Comparisons of the various larval stages of *M. cordatus* substantiate his findings. The average head width of third instar larvae was 1.5 greater than that of second instars, and that of second instars 1.6 greater than that of first instars.

The phylogenetic position of this tribe is uncertain. Adults and larvae have definite structural affinities with both Pterostichini and Scaritini, two widely separated tribes. The problem of phylogenetic position will be considered in a future paper.

LOCALITY RECORDS

BRAZIL. Amazonas: Igarape, Belem near Rio Solimoes, 70 Km. E. of Leticia, 18-28 V 1970, B. Malkin, under bark, [FMNH] (1).

MEXICO. Chiapas: 4.9 mi. N. of Frontera—Comalapa, 2 IX 67, G. E. Ball, T. L. Erwin and R. E. Leech, under bark, 2400 ft., [UASM] (3); 11.4 mi. S. of Solosuchiapa, Route 195, 25 IV 66, G. E. Ball and D. R. Whitehead, under bark of tree down ca. 1 yr., 2100 ft., [UASM] (2); 16.3 mi. S.W. of Los Cruces, 29 VIII 67, G. E. Ball, T. L. Erwin, and R. E. Leech, under bark, 2820 ft., [UASM] (1). *Jalisco:* near Ixtapepec, gallery forest, 22 XII 70, G. E. Ball and K. E. Ball, under bark of standing dead tree, 50 ft., [UASM] (2). *Veracruz:* 2.5 mi. W. of Sontecomapan, 21 VIII 67, G. E. Ball, T. L. Erwin, and R. E. Leech, under bark of log ca. 1 yr. old., 100 ft. [UASM] (20).

PANAMA. Canal Zone: Madden Forest, Los Cruces Trail, 2-VI-72, R. T. Allen, under bark of rotten tree [UAIC] (3); Barro Colorado Is. near Fairchild 6, 79° 56' W-9° 12' N, 28-II-75, 04-042 T. L. Erwin and J. L. Lawrence, under bark, [USNM] (4) (ADP43122, ADP43134, ADP43136, ADP43120); Barro Colorado Is. Zetek Trail, trail post #23, 9° 10' N-79° 50' W, 2-VII-74, T. L. Erwin and D. R. Whitehead, under loose bark of log, Expedition #55 in notebook #3, [USNM] (3) (ADP43118, ADP25623, ADP43117); Madden Forest, 1.5 Mi. N. Continental Divide, 79° 36' W-9° 5' N, 23-II-75, 04-029 T. L. Erwin and J. F. Lawrence, in bark, [USNM] (1) ADP43135.

ACKNOWLEDGEMENTS

I would like to thank Robert T. Allen, Max Meisch, Arthur Mueller, and Fred Stephen for reading the paper and offering helpful suggestions; George Ball and Henri Goulet of the University of Alberta, Edmonton, and Terry Erwin of the National Museum of Natural History, Washington, D.C., for their kind cooperation in lending specimens; and Russ Ann Shannon for typing the manuscript.

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